AC2: Key Outcomes – Year 11

Curriculum: Science

Excellence. No Excuses.

Section	Knowledge Code:	Outcomes:	How students will demonstrate success:
1	S11.2.1 Sexual and asexual reproduction	Scholars will know the cell process linked to sexual and asexual reproduction Scholars will remember how to explain how identical and non identical offspring are formed.	Identify where and when each process takes place
2	S11.2.2 Meiosis	Scholars will know how meiosis halves the number of chromosomes in gametes and fertilisation restores the full number of chromosomes. Scholars will remember how cells divide to form gametes	Extended writing, compare and contrast Mitosis and meiosis
3	**S11.2.3** **Advantages and disadvantages of sexual and asexual reproduction**	**Scholars will know the advantages of both sexual and asexual reproduction** **Scholars will remember how to apply these advantages to any organism.**	Model with one organism, scholars complete for novel organism.
4	S11.2.4 DNA and the genome	Scholars will know the structure of DNA and the make up of the genome. Scholars will remember how to discuss the importance of understanding the genome	Describe the process of HGP and how it has impacted us.
5	**S11.2.5** **DNA Structure**	**Scholars will know the structure of DNA as a polymer including bases** **Scholars will remember how to interpret a diagram of DNA structure**	Label diagram, explaining the function of each component
6	S11.2.6 Genetic Inheritance	Scholars will know the key terms in genetic inheritance Scholars will remember how to use a Punnett square to determine probabilities of the outcomes on a monohybrid cross.	Draw Punnett square to give probabilities of inheritance in different formats
7	S11.2.7 Inherited disorders	Scholars will know that polydactyly is caused by a dominant allele and cystic fibrosis by a recessive allele Scholars will remember how to make informed judgements about the economic, social and ethical issues concerning embryo screening, given appropriate information.	Polydactyly (having extra fingers or toes) is caused by a dominant allele. Cystic fibrosis (a disorder of cell membranes) is caused by a recessive allele. Appreciate that embryo screening and gene therapy may alleviate suffering but consider the ethical issues which arise

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8	S11.2.8 Sex determination	Scholars will know ordinary human body cells contain 23 pairs of chromosomes and 22 pairs control characteristics only, but one of the pairs carries the genes that determine sex, females the sex chromosomes are the same (XX). In males the chromosomes are different (XY). Scholars will remember how to carry out a genetic cross to show sex inheritance and use direct proportion and simple ratios in genetic crosses.	Punnett squares
9	S11.2.9 Variation	Scholars will know the causes of variation; • the genes they have inherited (genetic causes) • the conditions in which they have developed (environmental causes) • a combination of genes and the environment. • mutation Scholars will remember how to describe simply how the genome and its interaction with the environment influence the development of the phenotype of an organism.	Link types of variation to causes
10	S11.2.10 Evolution	Scholars will know that evolution is a change in the inherited characteristics of a population over time through a process of natural selection which may result in the formation of a new species. Scholars will remember how to explain how evolution occurs through natural selection of variants that give rise to phenotypes best suited to their Environment.	Need to be able to know and explain each of the stages. Then apply these stages to particular situations.
11	S11.2.11 Selective Breeding	Scholars will know the impact of selective breeding of food plants and domesticated animals and the key steps involved. Scholars will remember how to Explain the benefits and risks of selective breeding given appropriate information and consider related ethical issues.	Recall the stages then apply to different examples i.e. cows, chickens, plants…..
12	S11.2.12 Genetic engineering	Scholars will know that genetic engineering is a process which involves modifying the genome of an organism by introducing a gene from another organism to give a desired characteristic. Scholars will remember how to explain the potential benefits and risks of genetic engineering in agriculture and in medicine and that some people have objections.	Evaluate of benefits vs risks and ethical issues
13	**S11.2.13** **Cloning**	**Scholars will know how to explain the four types of cloning; tissue culture, cuttings, embryo transplants and adult cell cloning.** **Scholars will remember how to eexplain the potential benefits and risks of cloning in agriculture and in medicine and that some people have ethical objections.**	Evaluate of benefits vs risks and ethical issues
14	**S11.2.14** **Theory of Evolution**	**Scholars will know Darwin's theory of natural selection and the other competing theories.** **Scholars will remember how to explain how Darwin's theory was only gradually accepted and the reasons for this.**	Recall the theory then explain what it was better than Lamarck
15	**S11.2.15** **Speciation**	**Scholars will know the works of Darwin and Wallace and the steps which give ride to new species.** **Scholars will remember how to explain the impact of these ideas on biology**	Extended writing from memory, how these ideas impacted biology

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16	S11.2.16 The understanding of genetics	Scholars will know how Mendel developed our understanding of genetics Scholars will remember how to explain how our current understanding of genetics has developed over time,	Interpret pea plant diagrams. Link to other work on genetics
17	S11.2.17 Evidence for evolution	Scholars will know the evidence for evolution including fossils and antibiotic resistance in bacteria. Scholars will remember how to evaluate the evidence for Darwin's theory	State DToE and exaplin how at least two pieces of evidence support this
18	S11.2.18 Fossils	Scholars will know the three ways fossils are formed Scholars will remember how to extract and interpret information about fossil from a variety of sources.	Given a novel example of a fossil, explain how it was likely formed. Link the ages of the fossil and its complexity to DToE.
19	S11.2.19 Extinction	Scholars will know the definition of extinction Scholars will remember how to describe factors which may contribute to the extinction of a species.	Be able to explain in extended writing
20	S11.2.20 Resistant bacteria	Scholars will know that mutations of bacterial pathogens produce new strains. Scholars will remember how to explain how to reduce the development of antibiotic resistant strains.	Case study and how to prevent the problems this causes
21	S11.2.21 Classification	Scholars will know the seven levels of the Linnaean system of classification. Scholars will remember how to use evolutionary trees to see how organisms are related.	King prawn curry or fat greasy sausages. Identify the binomial name from an organisms classification.
22	S11.2.22 Principles of Organisation	Scholars will know the four levels of organisation Scholars will remember how to develop an understanding of size and scale in relation to cells, tissues, organs and systems.	Correctly identify the level of particular structures

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23	S11.2.23 The human digestive system	Scholars will know the names of the organs Scholars will remember how to describe the nature of enzyme molecules and relate their activity to temperature and pH changes. **Required practical activity 4**	Explain the lock and key model, active site and idea of denaturing.
24	S11.2.24 The heart and blood vessels	Scholars will know the structure of the heart and blood vessels. Scholars will remember how to explain how the structure of these vessels relates to their function and use simple compound measures such as rate and carry out rate calculations for blood flow.	Identify key structures and their functions
25	S11.2.25 Blood	Scholars will know the function of the blood components Scholars will remember how to recognise different types of blood cells in a photograph or diagram, and explain how they are adapted to their functions.	Identify key structures and their functions
26	S11.2.26 Coronary heart disease: a non-communicable disease	Scholars will know what CHD and two treatments (Stents and statins) Scholars will remember how to evaluate methods of treatment bearing in mind the benefits and risks associated with the treatment.	Identify the best treatment for a given patient
27	S11.2.27 Health issues	Scholars will know the different types of disease and their causes Scholars will remember how to describe the relationship between health and disease and the interactions between different types of disease.	Look at the type of diseases that are most likely to affect particular individuals, i.e. those with faulty immune systems.
28	S11.2.28 The effect of lifestyle on some non-communicable diseases	Scholars will know the risk factors linked to particular diseases Scholars will remember how to explain the effect of lifestyle factors including diet, alcohol and smoking on the incidence of non-communicable diseases at local, national and global levels	Case study of different people, what are they likely to be at risk from? What can be done. Translate information between graphical and numerical forms.
29	S11.2.29 Cancer	Scholars will know that cancer is the result of changes in cells that lead to uncontrolled growth and division Scholars will remember how to differentiate between benign and malignant cancers.	Extended writing
30	S11.2.30 Plant tissues	Scholars will know the structure of different plant tissues and their functions Scholars will remember how to relate plant tissue structure to function	Observation and drawing of a transverse section of leaf.
31	S11.2.31 Plant organ system	Scholars will know the structure and function of root hair cells, xylem and phloem Scholars will remember how to explain the effect of changing temperature, humidity, air movement and light intensity on the rate of transpiration.	Process data from investigations involving stomata and transpiration rates to find arithmetic means, understand the principles of sampling and calculate surface areas and volumes.